STANDARD OPERATING PROCEDURES MANUAL
CONTROL OF FUGITIVE DUST EMISSION SOURCES

FOR

COMPLIANCE WITH
NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS FROM
SECONDARY LEAD SMELTING

THE BATTERY RECYCLING COMPANY
ARECIBO, PUERTO RICO

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1.0 INTRODUCTION

1.1 BACKGROUND

The Battery Recycling Company (TBRC) owns and operates a lead recycling facility in Arecibo, Puerto Rico. The National Emission Standards for Hazardous Air Pollutants from Secondary Lead Smelting (40 CFR Part 63 Subpart X) or Maximum Achievable Control Technology (MACT) standard requires the preparation and implementation of a Standard Operating Procedures (SOP) Manual for controlling fugitive dust emission sources.

As defined under Subpart X, a fugitive dust source is: "a stationary source of hazardous air pollutant emissions at a secondary lead smelter that is not associated with a specific process or process fugitive vent or stack. Fugitive dust sources include, but are not limited to, roadways, storage piles, materials handling transfer points, materials transport areas, storage areas, process areas, and buildings."

At TBRC, fugitive dust sources include:

- Plant roadways
- Battery breaking area
- Furnace areas
- Refining and casting area
- Materials storage and handling area
- Baghouse dust waste storage and handling

This SOP addresses the elements required by the MACT standard, including:

- Measures used to control fugitive dust sources
- Daily records

1.2 PROCESS DESCRIPTION

Secondary lead smelting at TBRC includes three major operations: scrap pretreatment, smelting, and refining.

Scrap pretreatment is the partial removal of metal and nonmetal contaminants from lead-bearing batteries. The batteries are initially placed in an inclined conveyor which brings the batteries into a mill to be crushed and separated. In this process, the mill removes the electrolytes from the batteries and transfers the fluid through multiple sets of settling tanks. After the last set of settling tanks, the electrolyte material is sent to the facility's wastewater treatment plant. The milling machine shreds the plastic battery housings and separates the remaining battery components in water by their densities. The separation process produces solid lead (cell plates), lead oxide, separators, and plastic. The battery milling system operates independently from the facility furnaces. The operations of the

milling system depends on the amount of raw material (batteries) that are available for processing and the amount of lead and lead oxide that is stored.

Sufficient amounts of lead and lead oxide are stored to allow the facility to continue to operate its smelting process even during mill ruptures. Emissions from the furnace operations are not affected by the operation of the mill. The battery crushing process is limited to the mill. Batteries are not broken or cut before being placed in the mill conveyor. The steel casing of the large industrial batteries is removed prior to placing such batteries in the conveyor. No lead dust is generated when the steel casing is removed.

Once dried, the lead-containing separated components are prepared to be fed to one of the two facility rotary furnaces for smelting. Charge preparation is the process of loading the stored lead scrap and the other raw materials (soda ash, coal, lead, lead oxides, etc.) to the proper metallurgical requirements so it can be charged to the furnaces. Materials are loaded to a rotary steel hopper. TBRC loads raw materials into the hopper using one of four tractor loaders that are available at the site. Materials are not loaded by hand. To minimize emissions during charge preparation and furnace loading, some of the following OSHA recommended measures are implemented:

- TBRC provides vehicles with enclosed cabs that have positive pressure, HEPA-filtered air or employees using the loaders are always required to use full face OSHA approved respirators.
- Surfaces are kept wet and clean through the use of the water supply systems and vacuum cleaners.
- Vehicle speeds are reduced to minimize the dust activity.
- All surfaces have been repaved to facilitate housekeeping.

The rotary furnaces are fueled with used oil. Raw materials are charged into the furnaces using a rotary steel hopper which is charged into the furnace using a lift truck. Certain additives (soda ash, coal, etc.) are blended with the lead-containing components to achieve the desired properties of the product. Slag is removed from the furnaces, and the molten lead is then transferred to one of nine identical kettles for further refining (adding various constituents to achieve desired product properties). During the refining process, waste dross is skimmed from the top of the kettles and removed for later use. After the refining process has been completed, the lead is shaped into ingots (either round or square, depending on the customer's specification).

The battery breaking area, furnaces, kettles, slag, and raw materials are located inside covered buildings.

TBRC's operations do not include a blast furnace, dryer, or an agglomerating furnace; therefore, the requirements in the MACT standard related to these emission sources are not applicable.

Currently, the rotary furnaces, nine kettles, and process fugitive sources (lead taps and slag taps) are all exhausted to two eight-module baghouse units. A separate area was built for the ingot

preparation. This area is equipped with a exhaust system that collects emissions to be sent to the baghouses. The two baghouses exhaust through a common stack. The bags are cleaned by the shaker method. A particle detector is installed on each baghouse.

The following operations at the plant have the potential to generate fugitive dust. These areas include:

Plant roadways – Plant roadways include any area of a secondary lead smelter that is subject to vehicle traffic, including traffic by forklifts, front-end loaders, or vehicles carrying whole batteries or cast lead ingots. Excluded are employee and visitor parking areas that are not subject to traffic by vehicles carrying lead-bearing materials. Most of the sources of fugitive dust are inside the main plant building. The lead in the raw materials (batteries) coming into the plant and the final product (lead ingots) leaving the plant is transported in closed trucks or containers and will not become airborne.

Battery breaking area – This is the area of the plant in which lead-acid batteries are broken, crushed, and disassembled and separated into components.

Furnace and refining/casting area – This area includes the area where the rotary furnaces are located, refining operations occur (i.e., the kettle area), and casting operations occur.

Materials storage and handling area – The materials storage and handling area is any area of the plant in which lead-bearing materials (such as, broken battery components, reverberatory furnace slag, flue dust, and dross) are stored or handled between process steps including, but not limited to, areas in which materials are stored in piles, bins, or tubs, and areas in which material is prepared for charging to a smelting furnace.

Baghouse dust storage and handling area – This area includes the building where the baghouses are located, and any area where the containers of baghouse dust are stored or handled between the point of generation and its reuse in the smelting furnaces including, but not limited to, the soda ash storage building.

2.0 FUGITIVE DUST CONTROL PROCEDURES

This section identifies the procedures that are or will be put into place to control emissions from fugitive dust sources. The procedures include the source-specific requirements identified in §63.545(c) of the MACT standard.

Figure 1 is a schematic of the plant and shows the location of the various operating areas.

2.1 PLANT ROADWAYS

Truck traffic carrying raw materials (batteries and other lead-bearing scrap) and finished lead-bearing product enter and exit at the access gate at the south end of the property. The roads are paved. Plant operations (battery breaking, smelting, refining, slag storage, and raw material storage) occur inside covered buildings with paved travel surfaces.

2.1.1 Exterior Plant Roadways

Exterior plant roadways will be cleaned twice per day on days when there is not enough natural precipitation to prevent fugitive dust. Roadways include any surface that is subject to vehicle traffic, including forklifts, front-end loaders, and vehicles carrying whole batteries or cast lead ingots. Employee and visitor parking areas not subject to traffic by vehicles containing lead-bearing materials are excluded.

Cleaning of external roadways will include an appropriate combination of the following:

- Material removal – Materials deposited on the roadway will be promptly removed to prevent entrainment. Since the raw materials are stored indoors in bins, spilled materials are not anticipated; however, this bin storage can be a source of fugitive dust and any spilled materials will be promptly removed by shovel, broom, or other appropriate method.

- Wetting – Roadway dust in the truck loading/unloading area will be suppressed using a water spray system designed to keep the area damp as needed. Wetting suppresses particulate matter and helps prevent the material from becoming airborne and binds smaller particles together to further prevent them from becoming airborne. Water with no added suppressants will be used as needed. The water will be applied using a series of nozzles located throughout in the yard area.

- Vacuum cleaning – Paved travel roadways that handle lead-bearing traffic will be vacuumed as necessary.

2.1.2 Interior Travel Surfaces

Areas inside the plant production area are paved and are continuously cleaned and not less frequent than twice per day. Cleaning of internal travel surfaces will include the following:

- Material removal – Materials deposited outside of storage bins will be promptly removed to prevent entrainment. Spilled materials or materials outside of designated storage areas will be promptly removed by shovel, broom, or other appropriate method.
- Vacuum cleaning or wash down – Travel surfaces will be vacuumed or wet washed down, as necessary.

2.2 BATTERY BREAKING AREA

The battery breaking area is located inside the production building. Storage piles are contained within storage bins within the building. The storage bins consist of walls on three sides enclosing at least three-quarters of the perimeter of the stored material, which meets the MACT requirements for partial enclosure. The processed material in the battery breaking area is sufficiently wet from the process; no additional wetting of the material is necessary to prevent fugitive dust. (There is no dryer at the facility.)

2.3 FURNACES AREA

The furnaces area is located inside the production building. The production building is enclosed at least three-quarters of the perimeter of the operating area; therefore, the building is considered a partial enclosure. Additionally, the paved area within the building is cleaned twice a day as described above under Section 2.1.2.

Furnaces Area

i. TBRC will maintain at all times during operations a face velocity not less than 300 feet per minute at the furnace area.
ii. Access doors at the furnaces must be closed during normal operations. Except during the charging of raw materials, when an operator needs to access the area, at least one of the four doors must remain closed.
iii. After completing any repairs or equipment replacement in the furnaces that could affect the face velocity of the hood, the face velocity must be measured to make sure the 300 feet per minute requirement is met.
iv. A log of all face velocity measurements must be maintained that indicates the reason or event that made taking a measurement necessary.

2.4 REFINING AND CASTING AREA

The refining and casting area is located inside the production building. The production building is enclosed at least three-quarters of the perimeter of the operating area; therefore, the building is

considered a partial enclosure. Additionally, the paved area within the building is cleaned twice a day as described above under Section 2.1.2.

Kettles

i. TBRC will maintain at all times during operations a face velocity not less than 250 feet per minute at the refining kettles.
ii. After completing any repairs or equipment replacement in the kettle area that could affect the face velocity of the hood, the face velocity must be measured to make sure the 250 feet per minute requirement is met.
iv. A log of all face velocity measurements must be maintained that indicates the reason or event that made taking a measurement necessary.

2.5 MATERIALS STORAGE AND HANDLING

Materials are stored and handled inside the production building or slag building. Storage piles are contained within storage bins. The storage bins consist of walls on three sides enclosing at least three-quarters of the perimeter of the stored material, which meets the MACT requirements for partial enclosure. The material inside the production building is sufficiently wet from the process; no additional wetting of the material is necessary to prevent fugitive dust. (There is no dryer at the facility.) The area inside the building is paved, as is the area near the slag storage building.

2.6 BAGHOUSE DUST WASTE STORAGE AND HANDLING

The dust generated by the baghouses is collected, stored and reused in the smelting furnaces. This dust is a listed hazardous waste pursuant to 40 C.F.R.§ 261.

The baghouse hoppers directly discharge the dust waste into open 187-gallon containers. Generally, the facility generates about 6 of these containers every day, but this amount can vary depending on the intensity of the furnaces operation (e.g. maximum capacity).

An employee will monitor the container every 2 or 3 hours to verify when it gets full. The designated employee must ensure that excessive accumulation does not occur. Once full, each container will be carefully washed with an industrial water hose, and then will be covered with a resistant plastic wrap to minimize fugitive emissions. The area where the containers are placed, stored or handled between will be washed down to remove dust. The water from washing down the containers will go into a grid, then to a sump and will end in the water treatment plant to remove lead content.

Any spilled material will be promptly removed by shovel, broom, or other appropriate method.

A designated employee will take the covered container to the soda ash storage building where it will remain until reused and reintroduced into the furnaces along with raw material. The soda ash storage building is equipped with a steel security door that must remain closed at all times, except during unloading or transfer of the containers to the production building. Operators must ensure that doors

are properly closed.

All employees handling baghouse dust must wear at all times personal protective equipment, including respiratory protection devices.

3.0 DAILY RECORDS

Plant operators have been trained and conduct daily wet suppression, pavement cleaning, and vehicle washing activities performed to control fugitive dust emissions. Records of events or conditions not allowing daily controls will be kept at the site.

APPENDIX 1

DAILY FUGITIVE DUST LOG

THE BATTERY RECYCLING COMPANY

DAILY FUGITIVE DUST LOG

NOTE: CHECK ITEMS TWICE PER DAY

DATE:_____

Item to Check	**First Daily Check**		**Second Daily Check**		**Comments (Indicate if raining and identify any problems encountered.)**
	Yes/ No	**Time/ Initials**	**Yes/ No**	**Time/ Initials**	
Wet Suppression – Piles:					
Indoors – Are piles wet enough to prevent fugitive dust?					
Slag pile – Is pile wet enough to prevent fugitive dust? (Check spray nozzles and water supply)					
Pavement Cleaning – Exterior:					
Is wet suppression in yard working adequately? (Check spray nozzles and water supply)					
Start time for pavement cleaning					
End time for pavement cleaning					
Pavement Cleaning – Interior:					
Start time for cleaning					
End time for cleaning					
Vehicle Washing:					
Wash system operating?					
Baghouse Dust Waste Storage and Handling Area:					
Start time for cleaning					
End time for cleaning					

APPENDIX 2

Reuse of Collected Dust

Reuse of Collected Dust

Dust collected from the facility baghouses and the cleaning of the main building floor is reused and reintroduced into the furnace.

Proper handling of the collected dust can be accomplished in four steps:

1. Maintaining the hopper doors closed at all times except during unloading,
2. Frequently (at least once per day) removing dust from baghouse hoppers or building floor areas,
3. Enclose or cover containers used to transport collected dust from dust collection system,
4. Wearing at all times appropriate personal protection equipment during handling of collected dust,
5. TBRC provides vehicles with enclosed cabs that have positive pressure, HEPA-filtered air or employees using the loaders are always required to use full face OSHA approved respirators.

Hopper Doors

Hopper doors must be kept closed at all times, except during unloading operations. Operators must ensure that doors are properly sealed and the excessive accumulation does not occur. Operators must notify Shift Supervisor if the hopper is overloaded.

Removing Dust from Hopper

Collected dust must be removed on a daily basis.

Moving Collected Dust

After the dust has been removed from the collector hopper, it must be transported back to the furnaces to be mixed with the charge preparation. The charge preparation is the process of loading the stored lead scrap and the lead from with the other raw materials (soda ash, coal, lead, lead oxides, etc..) to the proper metallurgical requirements so it can be charged to the furnace. Materials are loaded to a steel hopper. TBRC loads raw materials into the hopper using one of four tractor loaders that are available at the site. Materials are not loaded by hand. To minimize emissions during charge preparation and furnace loading, some of the following OSHA recommended measures are implemented:

- TBRC provides vehicles with enclosed cabs that have positive pressure, HEPA-filtered air or employees using the loaders are always required to use full face OSHA approved respirators.
- Surfaces are kept wet and clean through the use of water supply systems and vacuum cleaners.
- Vehicle speeds are reduced to minimize the dust activity.
- All surfaced have been repaved to facilitate housekeeping.

Dust collected from the building floors must be placed with the charge preparation with every batch.

Vehicles and Protective Equipment

TBRC must provide vehicles with enclosed cabs that have positive pressure, HEPA-filtered air.

Employees using the loaders or handling collected dust must always use full face OSHA approved respirators.